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(54) **An umbrella operating mechanism**

(57) An umbrella operating mechanism is provided having a pair of hubs (31,32), each of which is securable to an umbrella shaft (33). Each hub has a plurality of spokes (34,35) extending from slots (25) defined in the hub and the spokes are pivotable in a plane through the axis of the hubs. The spokes (34,35) have an enlarged end (23) which is captured in the complementary shaped slots (25) between a pair of surfaces.

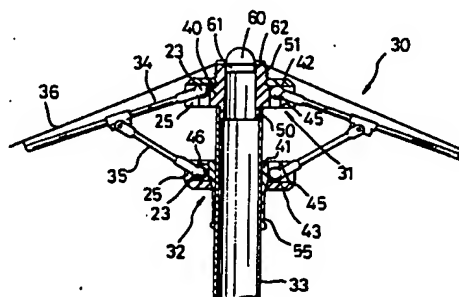


FIG. 3

Description

[0001] The present invention relates to an operating mechanism for collapsible umbrellas.

[0002] Most umbrellas have a shaft with a handle at one end and a collapsible canopy at the other end. The canopy is conventionally supported on a framework of struts which are in turn pivotally secured at one end to a hub fixed to the end of a shaft. The canopy is thus collapsed when the struts are pivoted towards the shaft, and expanded when the struts are pivoted to project substantially radially from the hub.

[0003] The struts are conventionally operated by stays, each stay being secured at one end to a strut and at the other end to a second hub which is slidably retained on the shaft. By moving the second hub towards the hub at the end of the shaft, the struts are encouraged by the stays to extend radially from the hub.

[0004] The struts and stays have their ends located in radially extending slots spaced about the circumference of the respective hubs. A wire passes through a hole in the end of the strut or stay and is fastened about the hub to secure the struts or stays in the hub.

[0005] For purposes of clarity, a conventional hub (1) and stay (2) assembly is shown in Figure 1. The hub is slidably mounted on an umbrella shaft (3) and has a plurality of stays (2) pivotally connected thereto. Each stay (2) has a flattened end (4) securely received in a radially extending slot (5) defined in the hub (1) by a length of wire (6) which runs in a circumferential groove (7) about the hub (1) and passes through a hole (not shown) in each end (4). Two ends (8) of the wire (6) are wound together so that a closed loop is formed by the wire (6).

[0006] This construction has a number of problems. If the ends of the wire are wound too tightly, the wire could break apart or the umbrella can be difficult to be operated. Assembly of the mechanism is labor intensive. Also, the struts and stays are required to have their ends flattened and then have holes drilled therein for the wire extending therethrough, this is also labor intensive. Furthermore, if the wound ends of the wire are not carefully concealed, they can cause injury to the user of the umbrella as well as damage to the fabric used to construct the canopy.

[0007] The present invention provides an improved operating mechanism so as to mitigate the problems as mentioned above.

[0008] In accordance with the present invention there is provided an umbrella operating mechanism comprising a hub securably mounted to an umbrella shaft and a plurality of spokes, each spoke having an enlarged end and the hub having a plurality of radially extending slots spaced about a circumference thereof. Each slot is shaped to receive the enlarged end of the spoke and the hub has a first surface and a second surface associated with each slot between which surfaces a spoke is operatively captured in a slot such that the spoke is pivotable in a plane through the axis of the hub.

[0009] Further features of the present invention provide for the first surface to be formed by a shoulder extending into a portion of the slot, and for the second surface to be formed by a releasably securable cover.

[0010] Still further features of the invention provide for the enlarged end of each spoke to be part spherical in shape, for the slots to be keyhole shaped in plan view, for the slots to be evenly spaced about the circumference of the hub, and for the hub to be molded from a plastic material.

[0011] According to one aspect of the invention, the hub is slidably securable on the umbrella shaft with the spokes forming stays.

[0012] According to a second aspect of the invention, the hub is fixed to the end of the shaft with the spokes forming struts.

[0013] The invention also provides an umbrella having an operating mechanism substantially as defined above.

[0014] The invention further provides a hub and spokes substantially as defined above.

[0015] Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

IN THE DRAWINGS

[0016]

Fig. 1 is a perspective view of a prior art hub and spokes slidably mounted on an umbrella shaft;

Fig. 2 is a top plan view of a first embodiment of an umbrella operating mechanism;

Fig. 3 is a part sectional side elevation of an umbrella having an operating mechanism according to the embodiment shown in Fig. 1;

Figs. 4 and 4a are perspective views of the hub in Fig. 3, which is fixed to the end of the umbrella shaft;

Figs. 5 and 5a are perspective views of the hub shown in Fig. 3, which is slidably secured on the umbrella shaft;

Fig. 6 is a perspective view of a second embodiment of a hub which is fixed to the end of an umbrella shaft; and

Fig. 7 is a perspective view of a second embodiment of a hub which is slidably secured to an umbrella shaft.

[0017] Referring to Figs. 2 to 5, an umbrella (30) has a shaft (33) with a first hub (31) and a second hub (32) mounted thereto. Each of the first hub (31) and the second hub (32) has a plurality of spokes (34, 35) pivotally extending therefrom. Each spoke (34/35) has an end (23) which is an enlarged end. In this embodiment the end (23) is part spherically shaped and extends from a neck (24) on the spoke (34/35). The neck (24) is of

reduced width to the spoke (34/35).

[0018] Each of the first hub (31) and the second hub (32) is circular in plan view and has a plurality of radially extending slots (25) evenly spaced about its circumference. The slots (25) each have a keyhole shaped when seen in a plan view and are respectively and operatively received the enlarged end (23) and neck (24) of a spoke (34/35) corresponding thereto.

[0019] The first hub (31) is fixed to an upper end of the shaft (33) while the second hub (32) is slidably mounted to the shaft (33). The spokes associated with the first hub (31) form struts (34) and the spokes associated with the second hub (32) form stays (35). The struts (34) support a fabric canopy (36) in conventional fashion and each stay (35) is hingedly secured, in a conventional manner, to a strut (34) partway along the length of the strut (34).

[0020] Each of the first and the second hub (31, 32) has a body (40, 41) in the form of a squat cylinder and a cover (42, 43) in the form of an annular disc which is releasably securable, as described below, to one side thereof to cover the slots (25). Each slot (25) in the first and the second hub (31, 32) has a shoulder (45) projecting into the enlarged portion (46) of the slot (25) against which the enlarged end (23) of a spoke (22) rests.

[0021] The body (40) of the first hub (31) has a central tube (50, 51) extending axially on each one of two sides thereof. The tube (50) provides a friction fit within the end of a tube forming the shaft (33) of the umbrella. The tube (51) is screw-threaded (52) partway up its length. Complementary threading (53) defined in an inner periphery defining the aperture through the cover (42) allows the cover (42) to be operatively secured to the body (40).

[0022] The body (41) of the second hub (32) has a tube (55) extending axially from the center of a lower side thereof. The tube (55) provides a sliding fit over the shaft (33). Two complementary screw-threadings (56, 57) respectively defined on the tube (55) and in an inner periphery defining an aperture through the cover (43) respectively allows the cover (43) to be operatively secured to the body (41).

[0023] The covers (42, 43) and the shoulder (45) in each slot (25) form a pair of surfaces between which the enlarged end (23) of a strut (34) or stay (35) is operatively captured in the slot (25). As the slots (25) extend through the length of the body (40, 41) of each of the first and the second hub (31, 32), the stays (34) or struts (35) are operatively captured in their respective slots (25) to be pivotable in plane through the axis of the respective first and the second hub (31, 32).

[0024] A boss (60) has a free end (61) which provides a friction fit within the free end of the tube (51) and the canopy (36) has a central aperture to allow the canopy to be secured by crimping between a pair of circumferential flanges (62) on the boss (60).

[0025] In use, the second hub (32) is slidably mounted

on the shaft (33) and the first hub (31) is fixed to the upper end of the shaft (33). The tube (55) of the second hub (32) extends away from the hub (31). It will be appreciated that this configuration allows the struts (34) and stays (35) to pivot in planes through the axis of the hubs so that the canopy (36) can be extended or folded in conventional fashion.

[0026] Each of the first and the second hub (31, 32) is molded from a plastic material and the struts (34) and stays (35) are made from a suitable metal.

[0027] The umbrella operating mechanism is durable and cost and labor effective. It also avoids the problems associated with prior art mechanisms of personal and canopy damage caused by the wire used to retain the spokes in the slots.

[0028] It will be appreciated however that many other embodiment of an operating mechanism exist which fall within the scope of the invention. As shown in Figs. 6 and 7, a cover (80/81) needs not be secured to a body (82/83) of a hub (84/85) by screw-threading, but could be secured by clips (86/87) spaced about the tube (88/89) extending radially and outwardly from the body (82/83).

[0029] Also, the enlarged end of each spoke need not be part spherical in shape but could in fact be in the form of a short circular sectioned member extending normally to the axis of the spoke. Furthermore, the enlarged end of each spoke could be captured in a slot by means of clips integrally formed in the slot itself and any suitable material can be used for the construction of the mechanism.

[0030] While particular embodiments of the present invention have been illustrated and described herein, it is not intended to limit the invention and changes and modifications may be made therein within the scope of the invention as hereinafter claimed.

Claims

1. An umbrella operating mechanism comprising a hub securable to an umbrella shaft and a plurality of spokes, each spoke having an enlarged end and the hub having a plurality of radially extending slots spaced about its circumference, each slot shaped to receive the enlarged end of the spoke, and the hub having a first surface and a second surface associated with each slot between which surfaces of the spoke are operatively captured in the slot such that the spoke is pivotable in a plane through the axis of the hub.
2. The umbrella operating mechanism as claimed in claim 1 wherein the first surface is formed by a shoulder extending into a portion of the slot.
3. The umbrella operating mechanism as claimed in claim 1 wherein the second surface is formed by a releasably securable cover.

4. The umbrella operating mechanism as claimed in claim 1 wherein the enlarged end of each spoke is part spherical in shape.
5. The umbrella operating mechanism as claimed in claim 4 wherein the slots each are a keyhole shaped in plan view. 5
6. The umbrella operating mechanism as claimed in claim 1 wherein the slots are evenly spaced about the circumference of the hub. 10
7. The umbrella operating mechanism as claimed in claim 1 wherein the hub is molded from a plastic material. 15
8. The umbrella operating mechanism as claimed in claim 1 wherein the hub is slidably securable on the umbrella shaft. 20
9. The umbrella operating mechanism as claimed in claim 8 wherein the spokes form stays.
10. The umbrella operating mechanism as claimed in claim 1 wherein the hub is fixed to an upper end of the shaft. 25
11. The umbrella operating mechanism as claimed in claim 10 wherein the spokes form struts. 30

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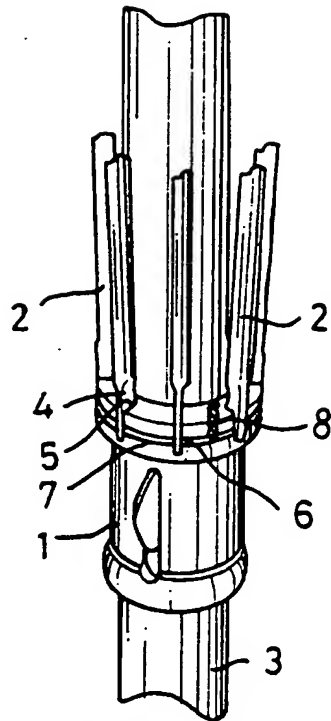


FIG. 1
PRIOR ART

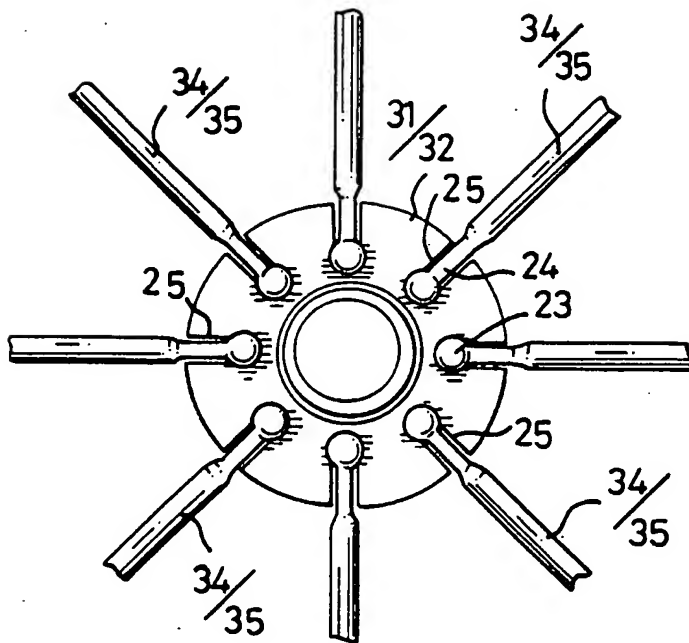


FIG. 2

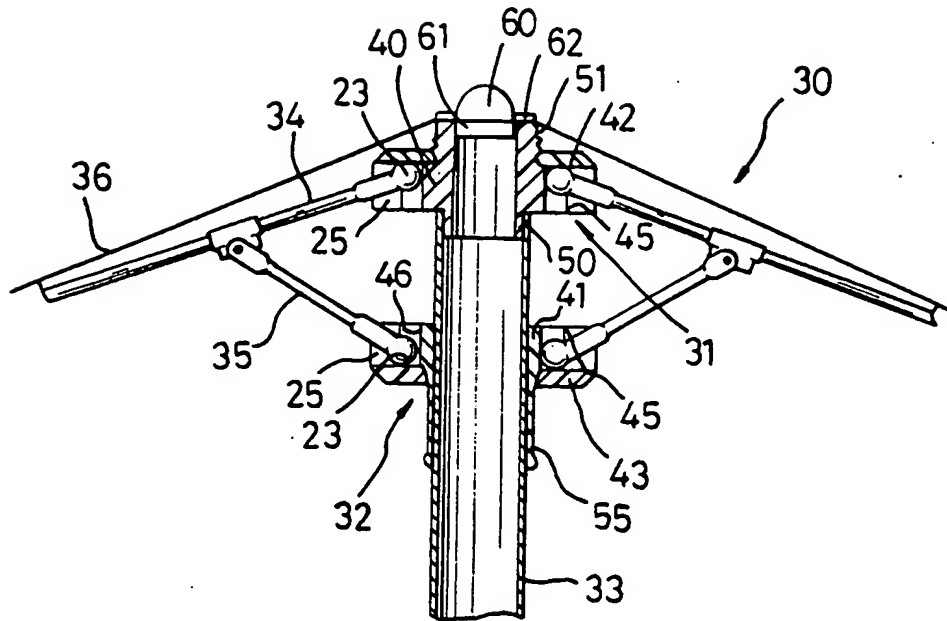


FIG. 3

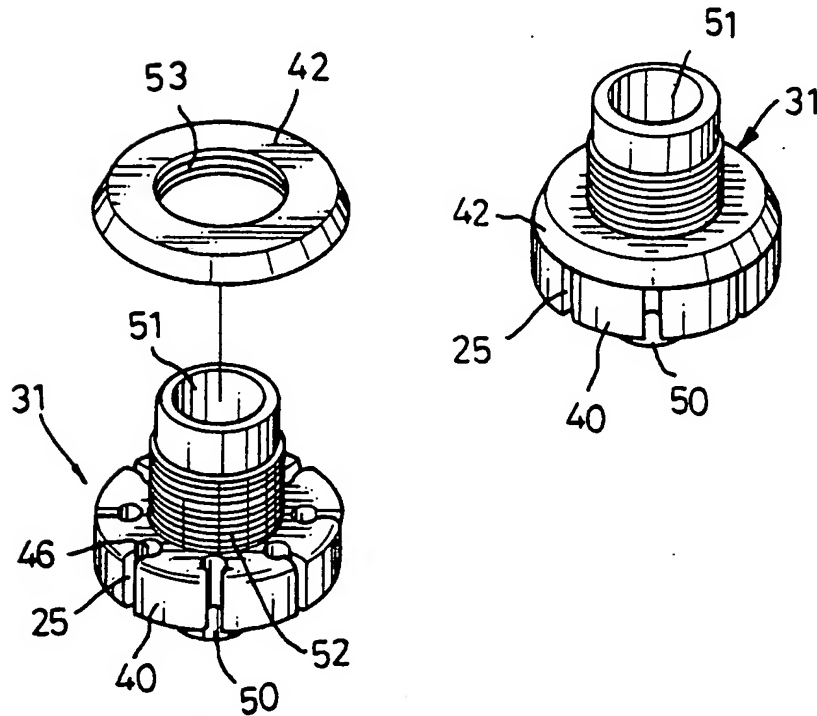


FIG. 4

FIG. 4a

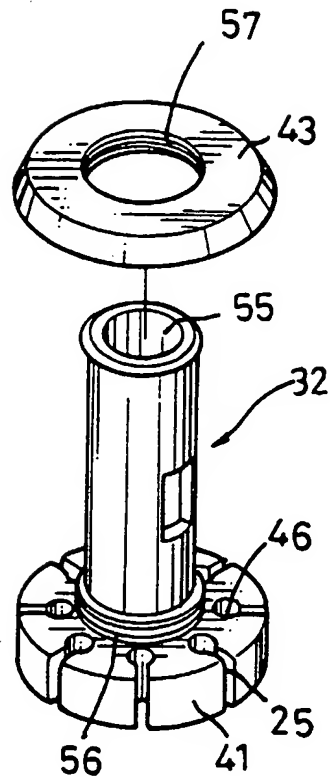


FIG. 5

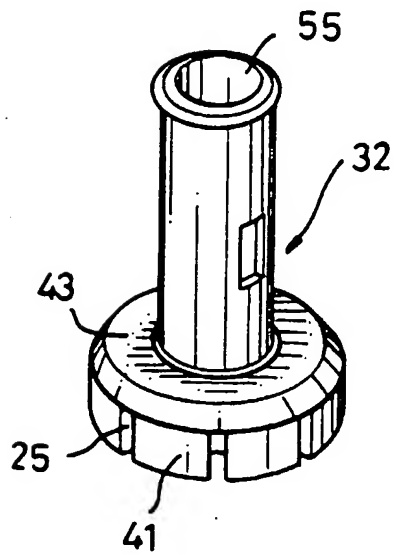


FIG. 5a

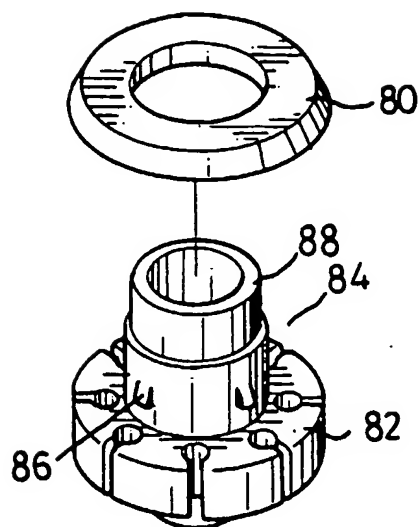


FIG. 6

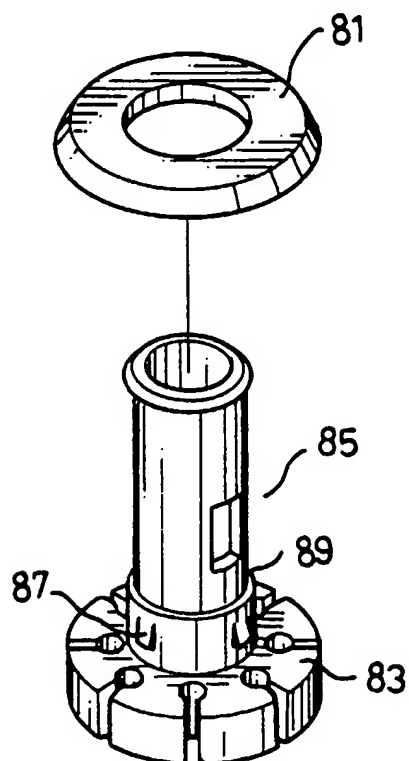


FIG. 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 8678

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
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| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 24 November 1998 | Examiner Sigwalt, C |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document | | | |

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